

## CLAIMS

What is claimed is:

- 1 1. A communication system, comprising:  
2 a network;  
3 a plurality of communication servers each coupled to the network; and  
4 a plurality of endpoints coupled to the network, each of the plurality of  
5 endpoints simultaneously capable of being directly controlled by one or more  
6 communication servers.
- 1 2. The communication system of claim 1 wherein the communication  
2 servers directly control endpoints independently of each other.
- 1 3. The communication system of claim 1 wherein one or more of the  
2 plurality of endpoints are coupled to the network through a terminal gateway.
- 1 4. The communication system of claim 1 wherein at least one of said  
2 communication servers includes a registration table containing a list of one or more  
3 endpoints that are registered with the respective communication server.
- 1 5. The communication system of claim 1 further comprising a table  
2 containing a list of each endpoint in the communication system, said table being  
3 located within one of the communication servers.

1           6.     The communication system of claim 1 further comprising a database  
2 server including a table containing a list of each endpoint in the communication  
3 system.

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1           7.     The communication system of claim 1 further comprising a plurality of  
2 terminal gateways coupled between the plurality of endpoints and the network.

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1           ~~8.~~    A communication system, comprising:  
2 a network;  
3 a plurality of communication servers each coupled to the network; and  
4 an endpoint including two or more logical lines, a first logical line being  
5 registered with a first communication server and a second logical line being  
6 registered with a second communication server.

1           9.     The communication system of claim 8 wherein the first and second  
2 logical lines are directly controlled by the first and second communication servers,  
3 respectively.

1           10.    The communication system of claim 9 wherein the first and second  
2 logical lines are simultaneously and directly controlled by the first and second  
3 communication servers, respectively.

1 11. The communication system of claim 8 wherein the endpoint is an  
2 analog telephone.

1 12. The communication system of claim 8 wherein the endpoint is one of  
2 the following: a digital telephone and a IP telephone.

1 13. The communication system of claim 8 wherein the endpoint is coupled  
2 to the network through a terminal gateway.

1 14. The communication system of claim 13 wherein the terminal gateway  
2 converts analog and digital signals received from the endpoint to packets for  
3 transmission on the network, and vice versa.

1 15. The communication system of claim 14 wherein the terminal gateway  
2 communicates with the first communication server using a first protocol, and  
3 communicates with the second communication server using a second protocol.

1 16. The communication system of claim 15 wherein one or both of the first  
2 and second protocols are one of following types of protocols: SIP, H.323, digital  
3 telephone protocol, media gateway control protocol, H.248, and Megaco.

1 17. The communication system of claim 8 wherein each communication  
2 server includes a registration table containing a list of one or more endpoints that  
3 are registered with the respective communication server.

1 18. The communication system of claim 8 further comprising a table  
2 containing a list of each endpoint in the communication system.

1 19. The communication system of claim 8 wherein said endpoint  
2 originates a first telephone call using the first logical line via the first communication  
3 server, said endpoint originates a second telephone call using the second logical line  
4 via the second communication server.

1 20. The communication system of claim 19 wherein said endpoint  
2 simultaneously appears as a valid endpoint to the plurality of communication  
3 servers.

1 21. A communications method for an endpoint, comprising:  
2 registering a first line of the endpoint with a first communications server, and  
3 registering a second line of the endpoint with a second communications server;  
4 establishing a first telephone call on the first line of the endpoint to a second  
5 endpoint via the first communications server; and

6 establishing a second telephone call on the second line of the endpoint to a  
7 third endpoint via the second communications server.

1 22. The communications method of claim 21 wherein establishing the  
2 second telephone call comprises establishing the second telephone call on the second  
3 line of the endpoint to a third endpoint via the second communications server,  
4 without disconnecting the first telephone call on the first line of the endpoint to the  
5 second endpoint via the first communications server.

1 23. The communications method of claim 21 further comprising receiving  
2 a third telephone call on the first line of the endpoint from a fourth endpoint via a  
3 third communications server.

1 24. The communications method of claim 21 wherein establishing the first  
2 telephone call comprises:

3 sending an off-hook message to the first communications server in response  
4 to detecting the first line going off hook;

5 receiving a dialtone message from the first communications server in  
6 response to sending the off-hook message;

7 sending the telephone number of the second endpoint to the first  
8 communications server;

9 receiving a ring message from the first communications server to the second  
10 endpoint;

11 receiving a connect message from the first communications server; and

12 communicating with the second endpoint in response to receiving the connect  
13 message.

1 25. A terminal gateway for coupling to a network and at least one  
2 endpoint, said terminal gateway comprising:  
3 a memory including one or more instructions; and  
4 a processor coupled to the memory, said processor, in response to the one or  
5 more instructions, to,  
6 establish a first communication path between a first logical line of a  
7 first endpoint and a second endpoint via a first communication server  
8 coupled to the network, in response to a first input, and  
9 establish a second communication path between a second logical line  
10 of the first endpoint and a third endpoint via a second communication server  
11 coupled to the network, in response to a second input, said second  
12 communication path being established via the second communication server  
13 independently of the first communication path.

1 26. The terminal gateway of claim 25 wherein the terminal gateway  
2 comprises at least part of the first endpoint.

1 27. The terminal gateway of claim 25 wherein the second and third  
2 endpoints are the same endpoint.

28. A communications apparatus, comprising:

- a time switch coupled to a trunk line and for coupling to one or more endpoints, the time switch receiving signals on the trunk line representing one or more communications calls for switching the signals to the one or more endpoints;
- a call server coupled to the time switch, the call server controlling the time switch for routing the one or more communications calls to the one or more endpoints; and
- a gateway coupled to the trunk line and the call server, and for coupling to a network, the gateway to convert between packets on the network and the signals on the trunk line, the gateway for registering the one or more endpoints with one or more communications servers coupled to the network for providing communication service to the one or more endpoints.

1           29.    The communications apparatus of claim 28 wherein the trunk line is a  
2   digital trunk line capable of carrying multiple channels to multiple endpoints via the  
3   time switch.

1           30.     The communications apparatus of claim 28 wherein the gateway  
2 comprises:  
3           a network interface module for interfacing to the network;  
4           a conversion module for converting packets of information to a digital bit  
5 stream, and vice versa;  
6           a trunk line interface for interfacing with the trunk line;

7 a processor coupled to the network interface module, conversion module,  
8 and trunk line interface for controlling the gateway and flow of information  
9 therethrough; and  
10 a memory for storing data and instructions.

1 31. The communications apparatus of claim 28 further comprising a  
2 communications server, the communication server registering the one or more  
3 endpoints that are coupled to the time switch for providing communication service  
4 to the one or more endpoints.

1 32. The communications apparatus of claim 31 wherein the  
2 communications server registers one or more other endpoints that are coupled to the  
3 network.

1 ~~33.~~ An endpoint for coupling to one or more communications servers,  
2 comprising:  
3 a first logical line for registering with a first communications server, said first  
4 logical line capable of receiving communications services from the first  
5 communications server; and  
6 a second logical line for registering with a second communications server,  
7 said second logical line capable of receiving communications services from the  
8 second communications server.



1           34.    The endpoint of claim 33 wherein the first and second logical lines are  
2 mapped to first and second keys on the endpoint.

1           35.    The endpoint of claim 33 further comprising a terminal gateway for  
2 coupling to the first and second communications servers via a network, said  
3 terminal gateway converting signals representing communications calls on the first  
4 and second logical lines to packets on the network, and vice versa.

1           36.    A computer program product, comprising:  
2           a computer usable medium having computer readable program code  
3 embodied therein to transmit a first registration message to a first communications  
4 server for registering a first line of an endpoint;  
5           computer readable program code to update a registration table registering  
6 the first line with the first communications server, responsive to receiving an  
7 acknowledgement message from the first communications server;  
8           computer readable program code to transmit a second registration message to  
9 a second communications server for registering a second line of the endpoint; and  
10          computer readable program code to update the registration table registering  
11 the second line with the second communications server, responsive to receiving an  
12 acknowledgement message from the second communications server.

1           37.    The computer program product of claim 36 wherein the computer  
2 readable program code is contained within a terminal gateway.

1 38. The computer program product of claim 36 wherein the computer  
2 readable program code is contained within an IP endpoint.

1 ~~39.~~ An endpoint, comprising:  
2 means for registering a first line with a first communications server means via  
3 a network means;  
4 means for registering a second line with a second communications server  
5 means via the network means;  
6 means for establishing a first communications call on the first line via the first  
7 communications server means; and  
8 means for establishing a second communications call on the second line via  
9 the second communication server means.

1 40. The endpoint of claim 39 wherein said means for establishing the  
2 second communications call comprises means for establishing the second  
3 communications call on the second line via the second communications server  
4 means, without disconnecting the first communications call on the first line via the  
5 first communications server.

1 41. The endpoint of claim 39 wherein said means for establishing the first  
2 communications call comprises:  
3 means for sending an off-hook message to the first communications server in  
4 response to detecting the first line going off hook;

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5 means for receiving a dialtone message from the first communications server  
6 in response to means for sending the off-hook message;  
7 means for sending a telephone number of a remote endpoint to the first  
8 communications server;  
9 means for receiving a connect message from the first communications server;  
10 and  
11 means for communicating with the remote endpoint in response to said  
12 means for receiving said connect message.

1 ~~42.~~ A communication system, comprising:  
2 network means;  
3 a plurality of server means coupled to the network means; and  
4 endpoint means coupled to the network means, said endpoint means  
5 including a first logical line means for registering with a first server means, and a  
6 second logical line means for registering with a second server means.

1 43. The communication system of claim 42 wherein the first and second  
2 logical lines means are directly controlled by the first and second server means,  
3 respectively.

1 44. The communication system of claim 42 wherein said endpoint means is  
2 one of the following: an analog endpoint means, a digital endpoint means, and an IP  
3 endpoint means.



10 means for updating the registration table registering the second line with the  
11 second communications server, responsive to receiving a second acknowledgement  
12 message from the second communications server.

1 49. The terminal gateway of claim 48 further comprising:  
2 means for requesting a first call on the first line from the first communications  
3 server;  
4 means for receiving a first connect message with an IP address of a first  
5 terminal gateway from the first communications server; and  
6 means for communicating with the first terminal gateway using the IP  
7 address of the first terminal gateway.

1 50. The terminal gateway of claim 49 further comprising:  
2 means for requesting a second call on the second line from the second  
3 communications server;  
4 means for receiving a second connect message with an IP address of a second  
5 terminal gateway from the second communications server; and  
6 means for communicating with the second terminal gateway using the IP  
7 address of the second terminal gateway.